

# **The costs of climate change and their insurance**

## **Summary of AR5, WGII, Chap.10**

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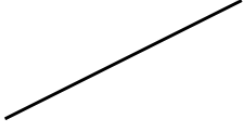
Member of OcCC

# Introduction

- Chapter 10 is about the impacts of climate change for the sectors energy, water, transportation, tourism, agriculture, health, finance and insurance
- Nothing much is new or surprising
- Main message: climate change is merely one of many changes that will affect most economic sectors over the next decades
- My focus is on (a) global cost estimates and (b) insurance (sect. 10.9 and 10.7)

# Qualitative assessment of sectoral impacts

Table 10-10: Summary of findings. (extract)

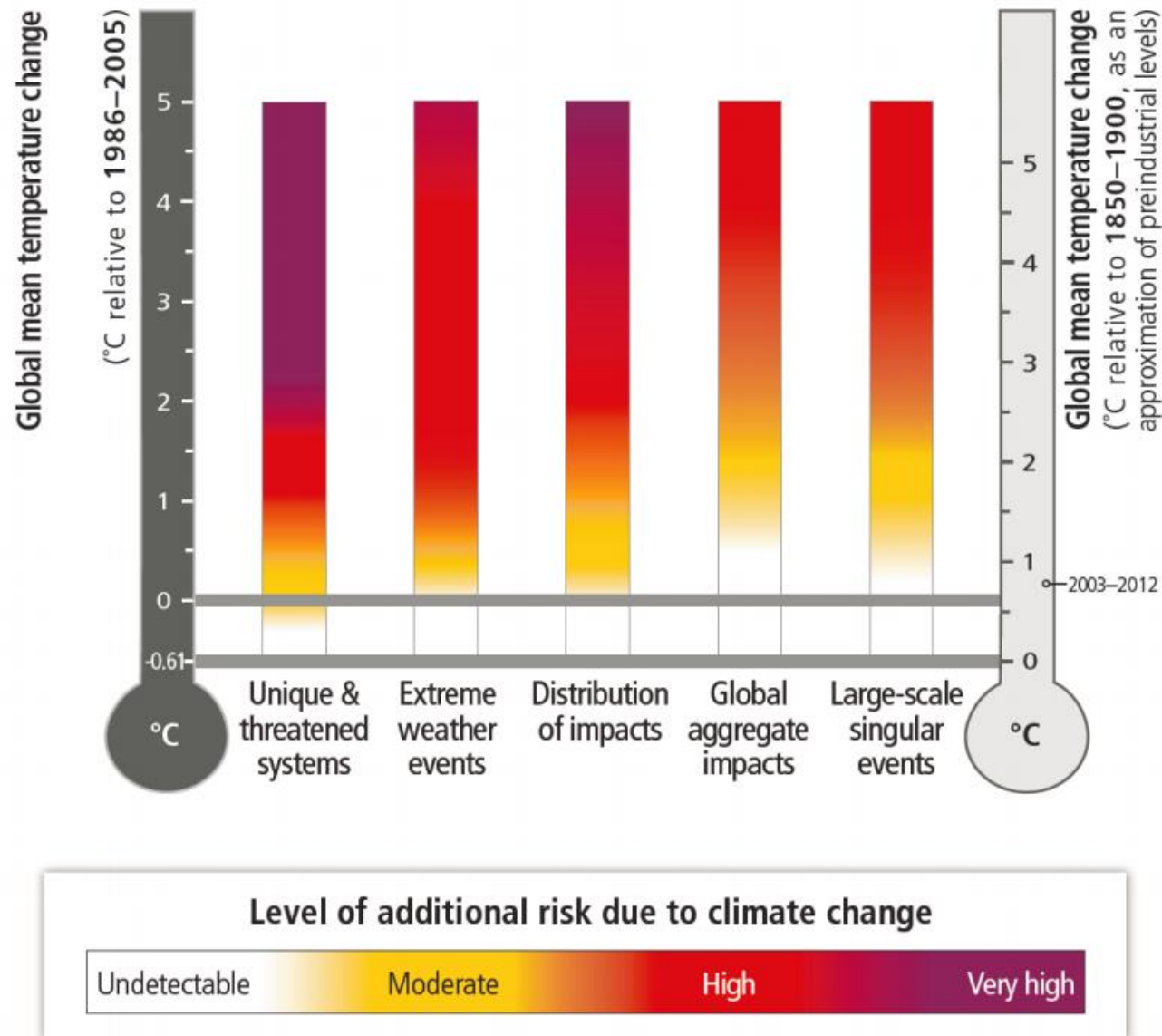
Sector	CC Drivers	Sensitivity to CC	Sign	Other Drivers	Relative Impact of CC to Other Drivers
Winter tourism	Temperature Snow		Negative	Population Lifestyle Income Aging	Much less
Summer tourism	Temperature Rainfall Cloudiness		Negative for suppliers in low altitudes and latitudes Positive for suppliers in high altitudes and latitudes Neutral for tourists	Population Income Lifestyle Aging	Much less

# Global aggregate impacts

- Existing estimates are often **incomplete** (missing sectors, no catastrophic damages or tipping points, no adaptation) and depend on a large number of disputable assumptions
- Global annual economic losses for  $\sim +2^{\circ}\text{C}$  are estimated between **0.2 and 2.0% of income** (*medium evidence, medium agreement*)
- Losses are more likely than not to be **greater**, rather than smaller, than this range (*limited evidence, high agreement*)
- There are large differences between and within countries
- Losses **accelerate** with greater warming (*limited evidence, high agreement*), but few quantitative estimates have been completed for additional warming around  $3^{\circ}\text{C}$  or above

(SPM 31-03-2014, p.19)

# Overall, global aggregate impacts are not the main concern



Assessment Box SPM.1 Figure 1

# Dispersion of estimates

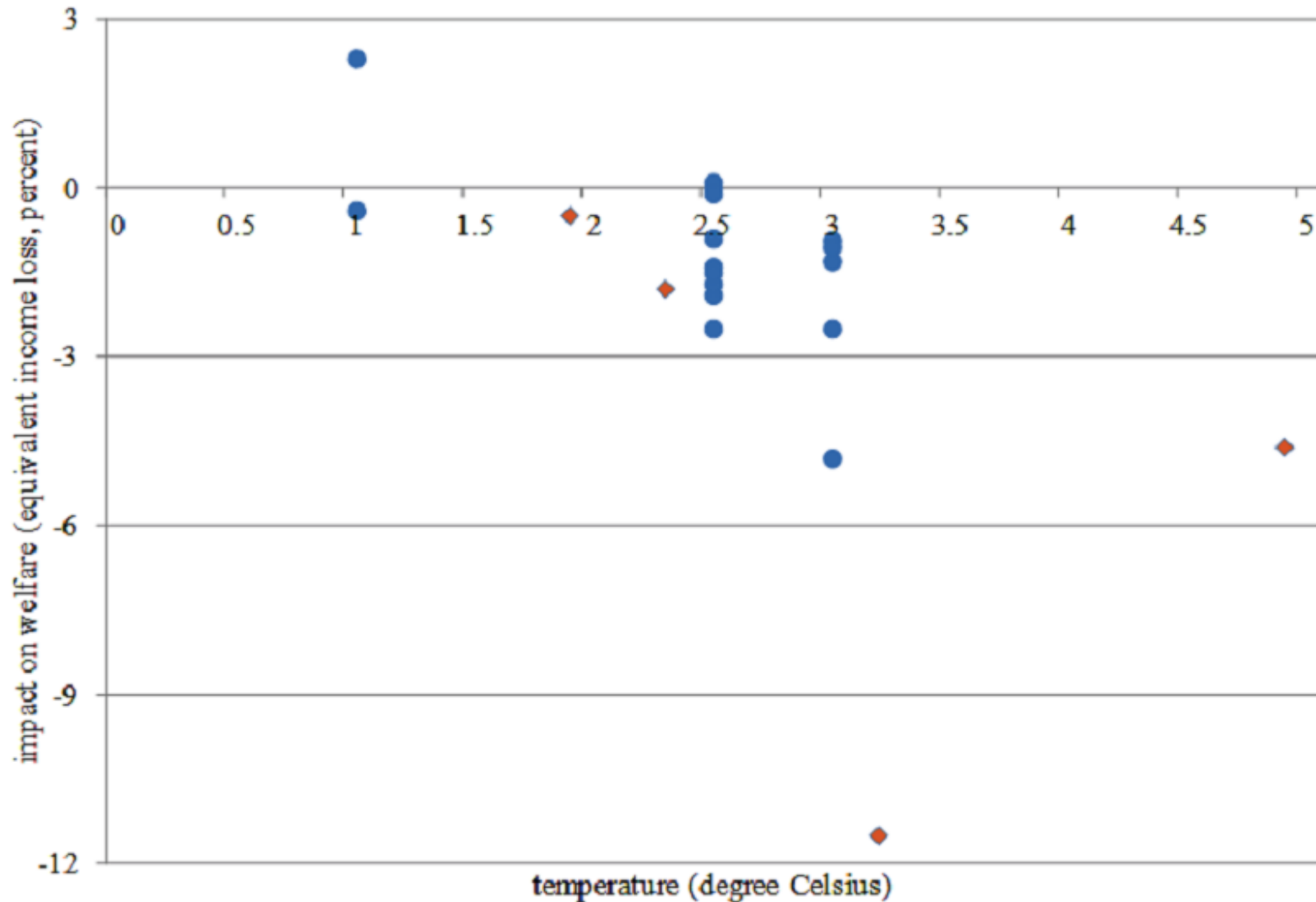
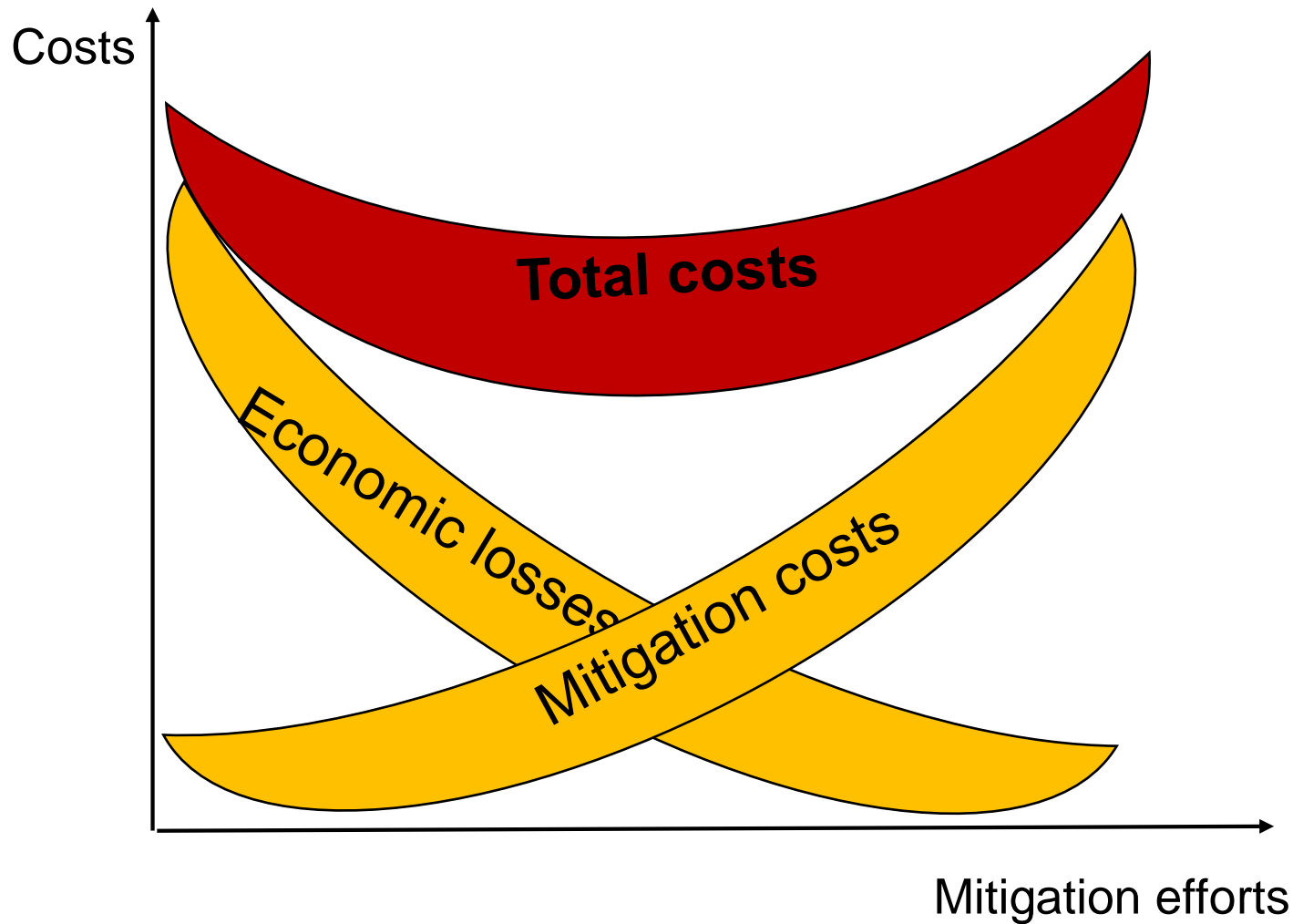


Figure 10-1: Estimates of the total impact of climate change plotted against the assumed climate change (proxied by the increase in the global mean surface air temperature); studies published since IPCC AR5 are highlighted as diamonds; see Table 10.B.1.

# The importance of global economic losses



# Marginal social cost of carbon

- "Estimates of the incremental economic impact of emitting carbon dioxide lie between a few dollars and several hundreds of dollars per tonne of carbon (*robust evidence, medium agreement*)
- Estimates vary strongly with the assumed damage function and discount rate."

(SPM 31-03-2014, p.19)



# Marginal social cost of carbon

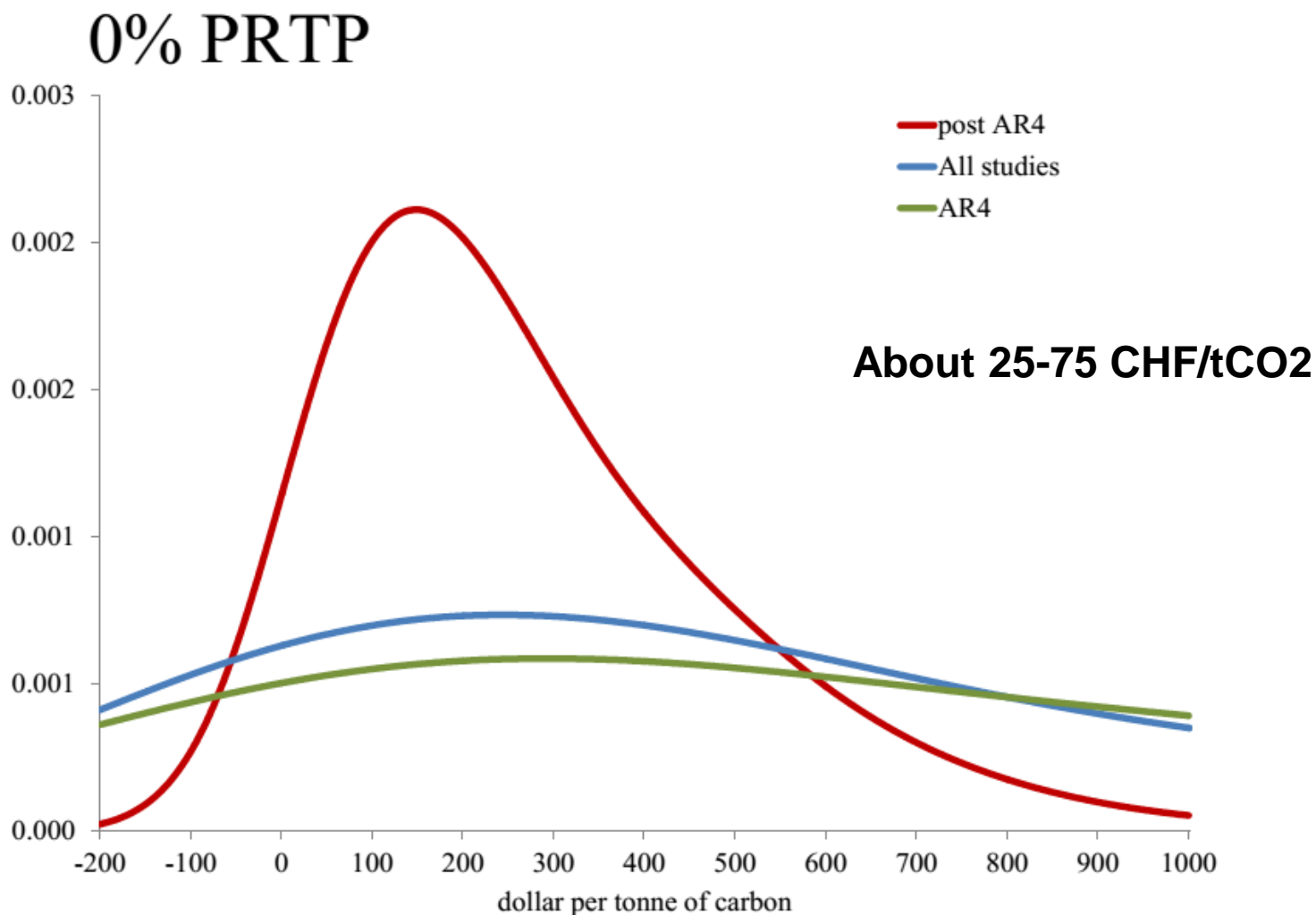


Figure 10-2: Kernel densities of the social cost of carbon for all studies and studies before or after AR4 for 0% pure rate of time preference (PRTP).

# Impacts on the insurance system: past trends

- Compensation paid out by private insurances for weather-related losses increased by US\$ 1.4 bn/yr between 1980 and 2008
- Greater concentrations of people and wealth in periled areas and rising insurance penetration are the most important drivers of increasing compensations
- It is hard to estimate the climate change signal in the growth in paid-out compensation
- Positive trends have been shown for various insured losses, but they have not yet been attributed conclusively to anthropogenic climate change

# Impacts on the insurance system: future trends

- Direct losses and fatalities from **flooding** will increase with climate change in various locations in the absence of adequate adaptation, given very likely wide-spread increases in heavy precipitation
- Direct losses and fatalities from tropical **cyclones** will increase with exposure and may increase with the frequency of very intense cyclones in some basins
- **Winter storm and hailstorm** insurance losses in Europe are projected to increase
- The additional uncertainty induced by climate change translates into a need for more **risk capital**, particularly in middle- and low-income countries

# Key messages

- For most economic sectors, climate change is not a central concern for the next few decades
- There is still great uncertainty about climate-change induced losses, particularly beyond +2.5°C
- Below that level, these losses are not large (<3% of incomes)
- The scientific community is still far from a consensus on the social cost of carbon
- No clear evidence yet of climate-change induced increases in insured losses, but the forecasts are gloomy